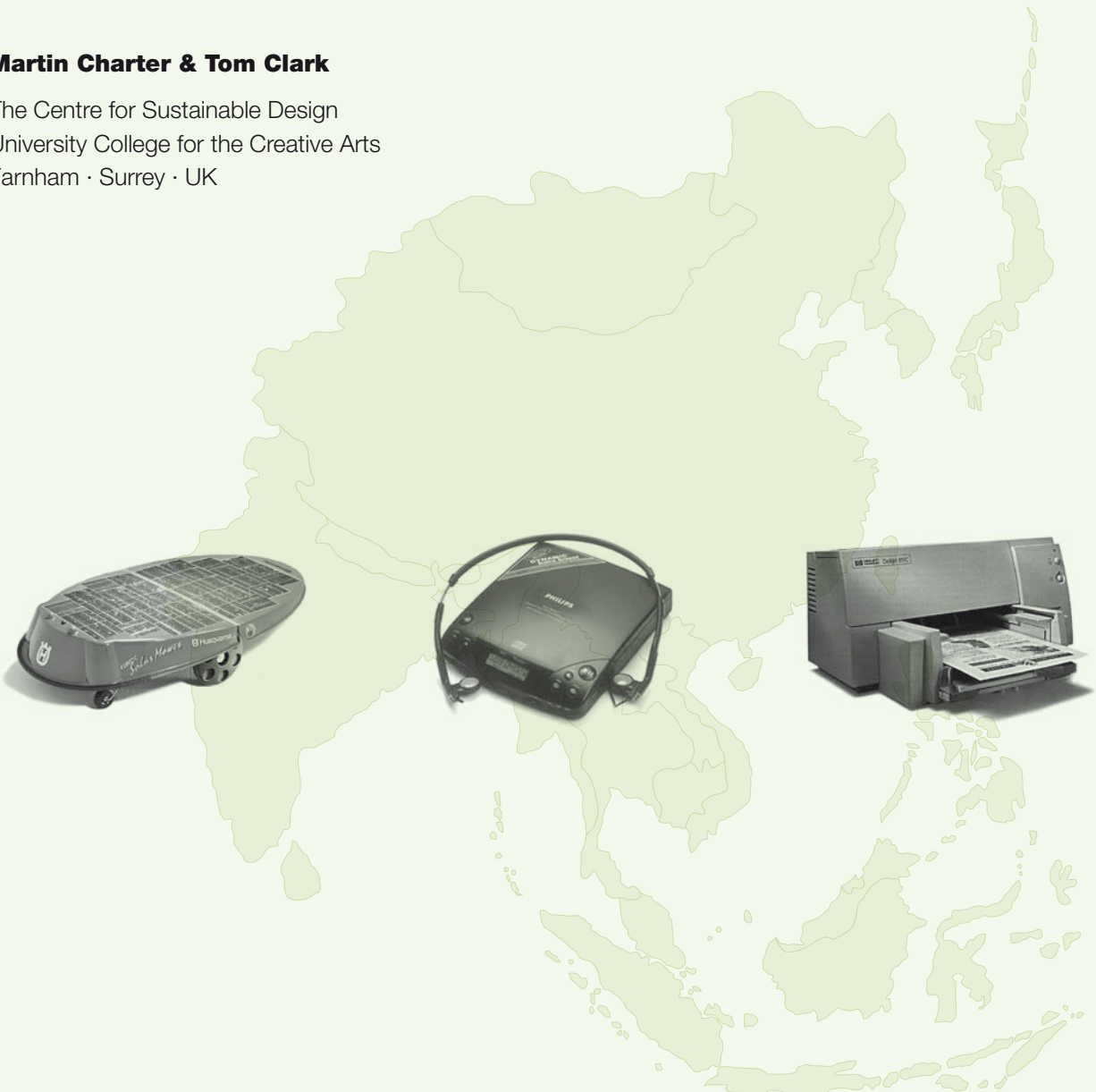# aede

asia eco-design electronics

Issues and capacity-building needs of the Asian electronics sector

in complying with international product-related environmental regulations and other requirements

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Contents

Abstract and key messages

This report summarises the findings and conclusions of reports prepared to date under the Asia Eco-Design Electronics (AEDE) project supported by the European Commission (EC). AEDE is concerned with assisting Asian small and medium-sized enterprise (SME) electrical and electronics (EE) suppliers in compliance with European and other international product-related environmental regulations and other requirements.

To this end, the first phase of work has involved identifying international regulatory and other initiatives, assessing the potential impact on Asian SMEs and identifying capacity-building needs.

This report consolidates and summarises the results of five reports by the collaborating partners: a summary and assessment of initiatives in Europe and Japan, country reports for China, India and Thailand and a survey of supply chain product environmental initiatives by transnationals corporations (TNCs). These reports as well as their annexes should be referred to for further details (see Reports on **www.cfsd.org.uk/aede**)

General findings

Importance of the electronics sector and electronics SMEs in Asian economies

The country and other reports (UNCTAD 2004 and 2006) highlight the growth, scale and national economic importance of the electrical and electronics (EE) sectors in South/South East Asia. The EE industry has played a major part of export-led economic growth in China, India, Thailand, Malaysia, the Philippines and Singapore.

The AEDE country reports covering China, India and Thailand also illustrate the complexity of the EE industry and its supply chain structures by product, component or service, and type of company (including manufacturing or assembly). They indicate the large numbers and importance of SMEs within the industry and national economies, for example with respect to numbers employed and benefits for local communities and national economies.

SMEs constitute the majority of EE enterprises. Larger, foreign owned or joint venture enterprises nevertheless dominate production, exports and supply chains.

Increasing regulatory and other developments affecting Asian SMEs

Various product environmental-related regulatory and other developments are emerging or have emerged in Europe, Japan and elsewhere that are significant or potentially significant for suppliers. All suppliers to major international markets will have to comply with increasingly stringent requirements.

In the short term the most important development is the European 'RoHS' (Restrictions on Hazardous Substances) Directive, which came into force on 1st July 2006, restricting or banning certain hazardous substances from new electronics products entering the European Union (EU). Other countries have been following with their own versions of RoHS, including Japan, China, South Korea and, in the USA, California and other States. Also important in the short-term is the 'WEEE' (Waste from Electrical and Electronics Equipment) Directive, that came into force in 2006 and was implemented in most EU Member States (MS).

In Europe a number of other environmental and product-related Directives and other initiatives are in the pipeline, including 'EuP' (Eco-design of Energy-using Products) Directive and 'REACH' (Registration, Evaluation and Authorisation of Chemicals). These do not have any immediate-term requirements but could have significant implications in the medium to longer term e.g. in imposing eco-design and information provision requirements on suppliers.

In Japan, laws relevant to WEEE were already established in 2001.The main laws are the Law for Promoting the Effective Utilisation of Resources (LPEUR), the Home Appliances Recycling Law (HARL) and the Green Purchasing Law. The first sets a framework for 'producer responsibility' and recycling across all industry sectors, the second gives producers/consumers of four main EE appliance types – air conditioners, washing machines, televisions and fridge/freezers – responsibility for 'take back' and recycling and the third requires green purchasing by the government sector. In addition, voluntary agreements covering lead-free et al were implemented from the 90s. These have already had some effect in greening the supply chains of Japanese EE companies since suppliers have been required to comply with environmental requirements in specifications.

Within Asia countries, as elsewhere, there are increasing problems with e-waste. National laws are being introduced to address these problems and these are referenced in the AEDE country reports.

In addition to increasing regulations there have been various environmental, health and safety (EHS) and corporate social responsibilty (CSR) developments that may have implications for electronics suppliers, including: green and socially responsible supply chain requirements by leading EE companies; the Electronics Industry Code of Conduct (EICC); the establishment of supply chain standards within the Global Environmental Sustainability Initiative (GeSI); eco-labelling and energy labelling schemes; eco-design standards by the International Electrotechnical Commission (IEC); ISOTR 14062; and the increasing adoption of other international standards e.g. ISO 14001, ISO 9001, OHS 18001 and SA8000.

Preparedness of suppliers for compliance

The various AEDE project reports, as well as other studies and anecdotal evidence, suggest that preparedness for compliance with product-related environmental requirements is generally low among Asian SMEs, especially those in lower tiers of supply chains.

There remains a lack of awareness, confusion and uncertainty, not helped by misinformation in some cases.

It should also be mentioned that confusion may also apply to larger companies to some extent but most appear to have had sufficient resources to manage compliance. Smaller SMEs typically lack management, technical and financial resources as well as access to information.

Assistance by governments and trade associations has been increasing but generally limited while the survey of practices by EE transnationals also suggests limited supply chain assistance beyond first tier suppliers (which are generally not SMEs). There are some exceptions: Thailand has been making significant efforts to prepare suppliers and some leading transnationals such as Philips have been actively working with second tier suppliers and beyond.

Assessment of implications for SME electronics suppliers

The work carried out for the AEDE project suggests that product-related environmental regulations and other developments, especially 'European RoHS', are having and will have major impacts on Asian SME EE suppliers.

In the short term, impacts on Asian EE SMEs, their employees and dependent communities are likely to be generally negative when considering the requirements and lack of preparedness:

▪ Compliance requires significant investment for suppliers in many areas, including product re-design, re-tooling of production lines, new materials, new processes, product testing facilities (in-house or by third parties), personnel training, management time, expenditure on consultants or advisers, potential write-off of redundant products and materials, investment in integrated management systems. Investment is likely to be an ongoing not one-off requirement as the performance bar is continually raised.

▪ The costs of compliance (RoHS is estimated as adding 5–10% to production costs) will be prohibitive for many already operating on low profit margins.

▪ As multinational EE companies 'green' their supply chains, non-compliant suppliers will be or have been eliminated from major supply chains and markets.

▪ SMEs will be most affected. Many may be restricted to domestic markets, forced to downsize or forced to close.

▪ SMEs account for the majority of EE enterprises and a very large proportion of employment in what is a key industry for Asian Economies. There could be significant unemployment impacts in locations where other work is unavailable.

▪ Since larger companies have been better placed to gear themselves for compliance they are likely to become more dominant at the expense of SMEs.

Suppliers which fail to meet compliance requirements or deadlines will be marginalised. SMEs which are not under the control or influence of transnational corporations (TNCs) or original equipment manufacturers (OEMs), or which are not well-informed by governments or trade associations are potentially most at risk of being unprepared for compliance. The extent of the impact is unclear, as many Japanese companies and TNCs have been working on hazardous materials replacement for several years.

In the medium to longer term the picture could be more positive.

Having adapted to change, the EE industries will have enhanced capability in environmental management and eco-design, and be better placed to respond to compliance challenges and market opportunities.

Raised awareness as well as mounting e-waste problems could help to stimulate and clean up WEEE recycling industries.

Gaps and needs for capacity building

The AEDE project work to date has suggested that there are significant capacity gaps for many SMEs and that there is a general need for capacity-building support through governments, trade associations or other agencies. There is a particular need for management and technical support in the area of information and eco-design. Other needs such as access to capital, tax breaks for investment and marketing support are outside of the scope of this project.

The project work has indicated some generic and basic management and technical elements which need to be in place among suppliers. Implementation at country and company level will need to be tailored to needs (see main report and country reports on **www.cfsd.org.uk/aede**).

Management elements which need to be in place include:

Systems

▪ Implementing management systems of appropriate sophistication, basic for small firms and more sophisticated for medium-sized or larger firms.

Information

- Timely and relevant information to keep abreast of changes and awareness of implications.

- Development and implementation of strategies for phasing out of hazardous substances, including investment in new production lines, equipment and materials, testing arrangements, training of personnel and other changes.

Planning

- Developing and implementing strategies for re-designing products and production processes as necessary to facilitate recycling, energy efficiency or other requirements and providing requisite information to customers in accordance with RoHS, WEEE or other requirements.

- Compliance with customers' corporate social responsibility (CSR) requirements (e.g. EICC and GeSI), developing plans for improving working conditions.

Organisation

- Developing management resources and skills to manage compliance and change, in particular planning, quality management (including auditing) and eco-design.

- Integration of eco-design and green procurement into organisational processes.

Technical elements which need to be put in place in suppliers include:

Awareness and training

- Basic awareness.

- Specific training including legislation and implications, planning for and managing change, management of eco-design, use of design tools, collection and communication of life cycle information (especially for EuP).

Technical implementation

- Available technologies for hazardous materials substitution.

- Testing methods and options.

- Use of eco-design tools and information systems for compliance.

The analysis suggests a likely need for the EC, possibly in cooperation with Japan and the US, and through appropriate national agencies, to provide some level of support to SMEs in Asian countries affected by RoHS, WEEE and other future initiatives e.g. EuP and REACH.

Planning: short, medium and long-term

The immediate need is to develop an overall short and long-term plan for the region as a whole and individual countries according to country needs analyses (see Reports on **www.cfsd.org.uk/aede**) and other work (UNCTAD 2004 and 2006).

This overall plan could include development and implementation of information and communications processes, briefings for senior management, training in compliance requirements and management, specialist training in eco-design, supply chain management and, as relevant, CSR issues, specialist technical training e.g. on testing.

In the short term the focus of effort needs to be on RoHS compliance and to concentrate on basic information and communication, and training across all areas, building on any existing initiatives and reaching as many SMEs as possible.

The medium to longer term plan should be to provide ongoing support to help SMEs to respond to future regulatory change and other initiatives in an effective way. The broad areas of need would remain the same but are likely to be at a more sophisticated level as skills and knowledge are developed. There is a need to institutionalise training and education programmes within the trade associations, professional training bodies and universities.

Planning for the longer term is likely to include building on and extending short and medium term initiatives as well as positioning to respond to continuing developments in Europe, Japan and the US.

Foreword

This report summarises the findings and conclusions of reports prepared to date within the Asia Eco-Design Electronics (AEDE) project supported by the European Commission (EC). AEDE is concerned with assisting Asian small and medium-sized enterprise (SME) electrical and electronics (EE) suppliers in compliance with European and other international product-related environmental regulations and other requirements.

To this end, the first phase of work has involved identifying international regulatory and other initiatives, assessing the potential impact on Asian SMEs and identifying capacity-building needs.

This report consolidates and summarises the results of five reports: a summary and assessment of initiatives in Europe and Japan, country reports for China, India and Thailand, and a survey of supply chain product-related environmental initiatives by transnational corporations (TNCs). The AEDE country reports provide reviews of the EE industries in the three countries as well as assessments of the potential impacts of product-related environmental regulations and recommendations on capacity-building needs. In addition, a workshop was held in Brussels in June 2006 to fill research gaps.

The various other reports are summarised in this report. They should be referred to, as well as their respective annexes (see Reports on **www.cfsd.org.uk/aede**).

The project work has been a collaboration between various partners:

- ▶ The Centre for Sustainable Design at the University College for the Creative Arts (UK)
- ▶ TERI-Europe (UK/India)
- ▶ Linkoping University (Sweden)
- ▶ Electronic Industries Association of India [ELCINA] (India)
- ▶ Rajiv Gandhi Foundation (India)
- ▶ Renmin University of China [RUC] (China)
- ▶ China Household Electrical Appliances Association [CHEAA] (China)
- ▶ The Electrical and Electronics Institute [EEI] (Thailand).

Information and support has also been provided by numerous other participants, including individuals companies, trade associations and others whose assistance is gratefully acknowledged.

Information was sourced from desk research, surveys and workshops during January to June 2006.

Activities planned under the AEDE programme include working conferences, the development of training tools and information links to help suppliers implement European, Japanese and other product-related environmental and sustainability regulations relating to EE equipment.

Based on the European and country specific overviews, gaps and future management and technical needs have been identified including short, medium and long term capacity building needs of suppliers in relation to meeting the EC, Japanese and other 'green' legislation and initiatives.

For the purposes of this study, 'management' issues include the integration of eco-design, green procurement and supply chain issues into existing management systems. 'Technical' issues include training requirements for eco-design and process change.

The assessment has also attempted to identify specific gender related issues that may exist for the sector, potential poverty alleviation measures for SME suppliers who face the danger of being marginalised as a consequence of the EC, Japanese and other measures.

1.0 Industry overview

1.1 The global industry

The Electrical and electronics (EE) industry is a major global industry characterised by a high product diversity, high volumes, continual growth and rapid technological and industry change. The total value of world trade, including information technology (IT) was $202 billion in 2003 (UNCTAD).

The industry can be broadly grouped into three categories: upstream, midstream and downstream. Upstream industries manufacture basic electronics materials, production equipment and components, including microelectronics. Midstream industries manufacture and assemble electronics components and equipment. Downstream industries manufacture prefabricated electrical and electronics goods such as (as covered by the European WEEE Directive) large household appliances, small household appliances, IT and telecommunications equipment, consumer equipment, lighting equipment, electrical and electronic tools, toys leisure and sports equipment, medical devices, monitoring and control instruments and automatic dispensers.

The sector is larger still when considering use in products not themselves classified as EE but containing electronics and, or electrical assemblies e.g. automotive electronics.

A further distinction is between original equipment manufacturers (OEMs) which make products or components used in products sold by other companies (often called 'value added resellers' or VARs), original equipment design and manufacturers (ODMs) which design and manufacture products sold under other brand names, contract assemblers, and brand companies selling to consumers via distributors.

The global industry is highly pyramidical in structure dominated by 25 large transnational corporations (TNCs) based in the US, Japan, Europe, Taiwan, Korea and elsewhere. Depending on the product sector, there are diverse types and sizes of firm, including large numbers of small and medium-sized enterprises (SMEs) producing specialist products, components and assemblies.

There are some well-known and obvious differences between the European and Japanese EE sectors. One is that in Europe's large, open market all of the major TNCs have manufacturing and/or distribution operations. There are, however, relatively few European-based EE transnationals – the exceptions being Philips and Siemens. In Japan, the presence of foreign companies is much more limited. There is a much larger number of big-name firms such as Sony which together dominate the home market and supply chains as well as being big players in international markets

EE production by TNCs, as well as by other larger producers in developed countries, is characterised by long supply chains with high levels of outsourcing and sub-contracting, much of it to Asian countries. Reducing labour costs through low cost sourcing has been the primary motive for this trend which is likely to continue.

While there is significant domestic production in Europe, Japan and the US (value around $57bn), imports from China, Philippines, Malaysia and Thailand were $36 bn to the EU and $17 bn to Japan in 2003 (UNCTAD).

1.2 Industry importance in China, India and Thailand

EE is now a significant foreign exchange earner for many Asian countries as well as supplying growing domestic markets. For example, EE accounts for around a quarter of the value of exports from China. The following summaries for China, India and Thailand are extracted from the respective country reports.

China

Electronics has been a pillar of China's economic growth with increases of nearly 20% annually. China is now the world's largest exporter of information and communications technology (ICT), including PCs, mobile phones, DVD players and digital cameras.

China's present electronics industry is largely concentrated in the southern coastal region. Enterprises and companies mainly consist of foreign invested enterprises (including cooperative, joint venture and exclusively foreign-owned enterprises), state-owned enterprises, cooperative domestic enterprises and private enterprises.

The five main export categories of Chinese electronic and electrical products are: consumer electronics (also called 'black electronics'), electronic components, household appliances (including 'white electronics' and small electric appliances), automatic data processing equipment and telecommunication products.

Chinese electronics exports have the following characteristics:

- Electronics exports are mostly to developed countries (accounting for two thirds of electronics exports).

- Electronics are an important part of total exports (accounting for about a third of all exports).

- The main exporters are foreign invested enterprises.

- Processing and assembling imported materials and parts are the major trade mode of exports.

Chinese electronic exports have grown significantly in recent years, led by the strong performance of foreign invested enterprises. The export value of the above 5 main export categories of Chinese electronic and electrical products amounted to $84.3bn in 2002; and reached $113bn in 2003. The export value of Chinese electronic and information products broke through $200bn in 2004 and continued to grow in 2005.

India

Electronics and information technology (IT) hardware manufacturing is an important and among the fastest growing industry sectors in India. Industry growth was 15.6% in 2004–05 against India's 8.5% growth in overall manufacturing during that year. Similar growth was achieved in 2005-06 against 10% growth. Total hardware production touched $12.73bn in 2005–06 with annual growth of around 12%.

An estimated 3.5 million people are employed directly in the industry and another 2.5 million indirectly e.g. in maintenance.

The industry is less well developed and much smaller than in China and is also less well integrated within the global manufacturing chain. 2005–06 exports were $1818.2 million of which 48% were components, industrial equipment (19%), computer equipment (15%), consumer equipment (14%), and telecommunications equipment (4%).

About 65–70% of the electronics products are covered by ITA (Information Technology Agreement) of the World Trade Organisation (WTO) with zero customs tariffs. It is anticipated that very soon, almost every IT and electronic product manufacturer in India will have no tariff protection and will be faced with global competition from imports.

In recent years there has been a shift by Indian IT and electronics companies towards software. As a result of a rapidly growing domestic market (e.g. India is forecast to be the second largest telecommunications market by 2007), the hardware industry is expanding fast due to new entrepreneurial Indian companies as well as foreign multinationals.

A continuing industry weakness, however, is that software design and hardware manufacturing are not integrated in India.

Thailand

The EE industry in Thailand has been a major growth sector for the country, although very small compared to the Chinese industry. The total export value in 2005 was around 1.44 billion baht.

A diverse range of downstream (finished goods) as well as components, materials and assemblies are produced across most main product types.

The industry consists of assemblers and suppliers: assemblers are mainly large foreign-invested firms or joint ventures producing brand products for the domestic and export markets e.g. Matsushita Electric Co. Ltd, producing Panasonic products. Most suppliers are SMEs. Of these Thai companies mainly produce electrical products for the domestic market e.g. rice cookers and TVs. Most electronics firms are foreign joint ventures.

Around half of exports go to Japan, the US and EU, as well as significant volumes to China and ASEAN countries.

1.3 Position and characteristics of EE SMEs in China, India and Thailand

General

SMEs form an important part of the economies of Asian countries, as with most national economies, and are an important part of Asian EE industries.

A healthy SME sector is widely recognised as beneficial for employment and for economic and community development, as well as an important source of innovation.

SMEs account for most enterprises and a significant percentage of employment in Asian EE industries. However, larger companies, often foreign-owned, dominate production and exports.

In the Asian countries being examined EE players may include:

a Major national OEMs (privately or state owned – as in the case of China).

b Corporately-owned and controlled subsidiaries of foreign-based TNCs.

c Locally-owned companies where a substantial part of production is sub-contracting to foreign TNCs in a close partnership arrangement, including investment, training and support for the supplier.

d Locally-owned SMEs, often entrepreneurial or family-owned businesses, operating independently and supplying domestic and international markets and customers directly or through intermediaries.

In general it is category d) where companies are likely to have least access to information and resources for responding to international environmental regulations and other product or initiatives.

China

SMEs account for around 99.6% of total Chinese enterprises and companies, 58.5% of GDP, and 75% of employees in towns (that have SMEs).

There are over 26,000 electronic enterprises in China, the majority being SMEs. SMEs have been important for the development of this sector because of their varied investment and ownership structures (mostly not owned by government) and their flexibility. Most of the SMEs in China are labour-intensive with the following characteristics:

▪ Small scale with low centralised production.

▪ Single-product provision, lack of capital, poor technology and specialisation level, and slow at launching new products.

▪ Low awareness of environmental protection and lack of environmental management systems.

▪ Lower information acquiring capacity and little knowledge of CSR issues and environmental product safety.

▪ Lack of necessary investment for technical improvement.

The China country report concludes that these companies are generally not well-prepared for compliance with new environmental requirements (see Section 3.0).

India

Except for a few TNCs and large corporate houses, the Indian electronics and IT industry structure consists mostly of SMEs. Even for large Indian corporate houses, electronics hardware is seldom the flagship company. Most companies, therefore, are small by global standards.

The scale-sensitive component manufacturing industry is also dominated by small players often characterised by closed family ownership. Many of these companies are typically smaller than the global definition of SMEs and employ few or no professionals with experience in global management practices.

The industry is dominated by global companies headquartered in US, EU, Japan and Korea which account for a significant share of India's total industry output. Recent mergers and acquisitions have led to an increased participation of international companies with large-scale operations.

In most cases, international companies have taken the acquisition route in India rather than commencing with green-field projects. While a few smaller companies have grown riding on the market boom and cost cutting measures, growth of the SME segment has been sluggish. Such companies are faced with the onerous task of complying with global environmental requirements and adopting best business practices. These companies are also most at risk from marginalisation from global supply chains (see Section 3.0).

Thailand

SMEs have an important role in the Thai EE industry, supplying parts and components to larger component and finished product assemblers. In 2005 SMEs employed 197,316 workers out of 534,003 employed in the industry. Of 1353 EE companies 715 were 100% Thai.

The industry is, however, dominated by foreign investment companies, especially the top 160 companies. The Thai-owned enterprises are nearly all small, employing less than 50 workers or owning business assets not more than 50 million baht for manufacturing and servicing.

TNCs have played an important role in bringing foreign investment into the country. In 2005, there was 100% foreign investment in 285 EE factories (113 small, 90 medium and 82 large enterprises) and in 363 joint ventures (177 small, 110 medium, and 76 large enterprises).

Foreign investment is also a significant part of the SME sector. In 2005, 482 EE SMEs were foreign-invested.

A survey conducted for the Thailand country report found that 80% of first tier suppliers had systematically responded to RoHS and other product-related environmental requirements through, for example, management systems, planning, allocation of resources, investment and training. Among second tier suppliers, 50% had made some systematic effort to respond while the other 50% had been 'firefighting'. There were general concerns regarding awareness in the second and third tiers of supply chains, although the Thai government has been actively raising awareness of product-related environmental issues (see Section 3.0).

The study found that the burden of RoHS compliance was disproportionately on second and third tier suppliers compared to the first tier.

2.0 Legislation and industry initiatives

This section provides an overview of existing legislation pertaining to environmental and sustainability requirements in EU and Japan as well as an overview of broader industry initiatives in Europe, Japan and internationally which are relevant to EE suppliers in Asia. The Europe-Japan report and its annexes provide further details (see Reports on **www.cfsd.org.uk/aede**).

2.1 Regulatory developments in Europe

The main product-related environmental legislative developments specific to EE are as follows:

▶ The Directive on the Restriction of Certain Hazardous Substances (2002/95/EC) (the 'RoHS' Directive), passed in March 2003; and

▶ The Directive on Waste from Electrical & Electronic Equipment (2002/96/EC) (the 'WEEE' Directive), passed in March 2003.

All EU Member States (MS) have been obliged to transpose these Directives into national legislation and to implement the practical requirements stated in the respective Directives. 'European RoHS' came into force on 1st July 2006 across all MS. At the time of writing, WEEE has been implemented in all but a few MS.

The main other product-related environmental legislation relevant but not specific to EE are:

▶ The proposed Directive on Eco Design and Energy Using Products (2005/32/EC) (the 'EuP' Directive) passed in 2005;

▶ The proposed Directive on Registration, Evaluation and Authorisation of Chemicals (COM (2003) 644) (the 'REACH' Directive);

▶ The Communication on Integrated Product Policy (IPP) published in June 2003.

These remain at the development phase but may have significant implications for EE suppliers (discussed in Section 3.0).

The various legislative developments are summarised in Table 1.

Table 1: Scope and status of European legislative developments

The European RoHS Directive

▶ The RoHS Directive bans the putting on the EU market of new EE containing more than the permitted levels of lead, cadmium, mercury, hexavalent chromium and both polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants.

▶ It applies to all of the main downstream EE end product groups as well as materials and components but there are a number of exempted applications and product categories (such as medical equipment) which remain under review.

▶ New products entering the market from 1st July 2006 are subject to testing and non-compliant products are to be removed from the market. Non compliant producers will be subject to fines.

▶ The Directive is enforced through national legislation and regulations which should be referred to for requirements in any specific MS.

RoHS came into force on 1st July 2006. Legislation has been passed in all Member States (MS), although some countries (newer MS, mainly in Eastern Europe) have a one year derogation for implementation of legislation.

The European WEEE Directive

▶ The WEEE Directive aims to prevent waste EE arising, to encourage reuse, recycling and recovery of e-waste and to improve the environmental performance of all operators involved in the lifecycle of EE equipment, especially those dealing with e-waste.

▶ It sets requirements relating to criteria for the collection, treatment, recycling and recovery of e-waste. It makes producers responsible for financing most of these activities.

▶ It applies to all EE equipment placed on the EU market which falls into any of ten product categories (similar to RoHS) up to 1,000 volts AC or up to 1,500 volts DC.

▶ Beyond implementing basic requirements, MS may transpose the Directive to their own levels. This has resulted in a diversity of approaches and levels of implementation. Specific countries' legislation and regulations need to be referred for specific national requirements.

WEEE legislation is in force in most MS. Some countries (newer MS, mainly in Eastern Europe) have a one year derogation for implementation of the legislation. Legislation in the UK has been delayed, probably until 1 January 2007.

The 'EuP' Directive

▶ The EuP Directive is intended to provide coherent EU-wide rules for eco-design and ensure that disparities among national regulations do not become obstacles to intra-EU trade.

▶ It does not introduce directly binding requirements for specific products, but defines conditions and criteria for setting, through subsequent implementing measures, requirements regarding environmentally relevant product characteristics (such as energy consumption) and allows them to be improved quickly and efficiently.

▶ The target date for national laws is 11 August 2007.

▶ Once the Directive is adopted by MS the EC may set eco-design requirements for specific energy-using products which have a significant impact on the environment, are sold in high volumes, have clear potential for improvement and where performance has not been satisfactory as a result of self regulation or existing laws.

▶ It covers energy-using products selling more than 200,000 units in the EU and covers a much wider range of products than RoHS and WEEE. In principle any energy-using product can be covered except for transport systems which are excluded. Climate change is one driver for the Directive but not the only one since eco-design considers all impacts.

▶ Products to be covered are still under consideration. At the time of writing, fourteen separate preparatory studies are being conducted for boilers, water heaters, PCs and computer monitors, office systems (such as printers), consumer electronics (including TVs), standby units, battery chargers and external power supplies, office lighting, street lighting, residential air conditioning, electric motors, commercial refrigerators and freezers, domestic refrigerators and freezers, and domestic dishwashers and washing machines.

▶ The Directive is unlikely to come into force generally within the EU before 2009. Individual MS may nevertheless bring forward the programme.

▶ It is expected that enforcement will be through self declaration and CE or other labelling and products may be subject to random testing. Information provided may include embedded energy and other impacts as well as performance in use. Producers will be expected to establish management systems and supply technical documentation on life cycle assessment (LCA) and compliance.

The REACH Proposal

▶ REACH (Registration, Evaluation and Authorisation of Chemicals) is intended to control hazardous chemicals use in the EU (not to ban specific substances).

▶ Under REACH, enterprises that manufacture or import more than one tonne of a chemical substance per year would be required to register it in a central database. This information would be passed down the chain of production.

▶ Failure to register will mean that a substance cannot be imported into the European market. Details of enforcement mechanisms are not yet available but it is expected that registration checks will be carried out and non-compliant suppliers subject to possible prosecution as well as withdrawal of products.

▶ The proposal is now being considered by the European Parliament and the Council of the EU for adoption under the so-called co-decision procedure.

▶ REACH applies to and has major implications for EE companies manufacturing within the EU or importing products and materials where the total quantity entering the market is above specified levels. The main implication at this point appears to be the cost of testing and registration for producers or importers in the EU. Since it applies to materials of concern contained in products it will place requirements on suppliers along the supply chain to declare material content. In this sense it could be even more onerous than RoHS for OEMs and suppliers with respect to testing and documentation.

Integrated Product Policy (IPP)

▶ An EC initiative, IPP is a governmental approach to reducing the environmental impact of products by using an appropriate mix of supply-side and demand-side environmental product policy (EPP) tools. Integration is designed to optimise results and may take place at various levels.

▶ At the national level there may be integrated consideration of product life cycle impacts, integration of EPP approaches, integration of EPPs with other aspects of environmental policy and integration of EPPs with other, non-environmental government policies.

▶ At the EU level, the EC is also concerned with harmonising EPP approaches between MS since the various countries have been progressing at widely differing rates.

▪ While businesses will be involved in implementing some supply-side aspects of EPP, for example applying eco-design and participating in eco-labelling, IPP development and implementation is primarily a task for government, especially on demand-side measures.

▪ IPP is being increasingly recognised not only as an approach to integrating EPPs but as a key aspect of national strategies for sustainable consumption and production (SCP). It is named as one of the major innovative elements in the EU's 6th Environmental Action Programme.

▪ In its 2003 Communication on IPP the EC published a timetable for action as follows:
2005: Issue of a practical handbook on LCA best practice and a discussion document on the need for product design obligations on producers (these do not appear to have materialised yet)

2006: Development of an action programme for greening of EC procurement
2007: Identification of a first set of products with the greatest potential for environmental improvement.

▪ IPP remains at the discussion stage and there are no immediate requirements for suppliers. Depending on how IPP is implemented through policies and Directives, however, it could have significant implications in the medium to longer term – for example in any future requirements for green purchasing by national governments. The EuP Directive also partly implements IPP.

▪ While the principles and term remain in use within the EC and some MS, the term IPP itself has lost favour in recent years.

It is useful to understand the general background and drivers for legislative developments.

There are various drivers for these developments including concerns regarding hazardous materials, and environmental and health risks along the product life-cycle (RoHS and REACH); growing volumes of waste EE (WEEE), the need to reduce greenhouse emissions and recognition of the need to improve product energy efficiency (EuP).

A key driver for EC legislation has accordingly always been harmonisation and standardisation of approaches to facilitate the workings of the single market. In the present context, the RoHS Directive has been transposed under Article 95 (on harmonisation) and has benefited from common regulatory approaches across MS, once agreement had been reached on details, especially substances and concentrations. Conversely the WEEE Directive under Article 175 has been implemented under environmental not harmonisation aims which has led to different approaches (in each MS) with respect to scope, pricing, responsibilities, producer registration, and collection and recycling arrangements. There is no central clearinghouse for European registration and a lack of uniform procedures for registration. Lobbying by and consultation with industry, amendments and practical difficulties have led to protracted delays in implementation of WEEE, especially in the UK.

The many issues and complexities relating to EU law highlights the importance for suppliers of gaining good quality information on technical and legal elements of legislation – whether selling directly, through subsidiaries, agents or supply chain customers.

The reported lack of awareness and preparedness of many Asian SMEs may have partly resulted from deficiencies in EC implementation processes, including: a lack of communication, lack of well-defined and established communication channels between the EC and European and Non-European SMEs (via government and industry associations or other methods); a lack of a central point of communication and advice in the EU; a possible lack of understanding by national government agencies and industry associations; the protracted implementation process which may have given the wrong signals that compliance was not an immediate issue.

They provide lessons for future implementation. In the context of EE and environmental performance the next relevant Directive is EuP. The indications at this stage are that there will be extensive research and stakeholder consultation. EuP also comes under DG Enterprise (ENT) and DG Transport and Energy (TREN), and is unlikely to be subject to separate regulatory approaches in different states and the need for complex implementation arrangements, the source of many problems for WEEE.

2.2 Regulatory developments in Japan

The main areas of relevant legislation are as follows:

▸ Fundamental Law for Establishing a Sound Material-Cycle Society (2001).

▸ Law for the Promotion of Effective Utilisation of Resources (LPEUR) in 2001.

▸ Home Appliances Recycling Law (HARL) (2001).

▸ Green Purchasing Law (GPL) was passed in 2001.

▸ Waste Management Law (2003).

▸ 'Japanese RoHS': Passed on 1st July 2006.

There have been some regulatory developments specific to EE, in particular HARL, but the emphasis has been on implementing a structured range of general legislation aimed at creating a 'recycling economy'.

The first three laws relate to the 3Rs of 'Reduce, Reuse, Recycle' with the Waste Management Law applying to disposal. The GPL applies to government purchasing and aims to create a green market for a number of publicly procured products. The aim has been to creating legislative circularity for the production process and a complementary range of strategic goals.

Hazardous substances in EE and WEEE are not specifically covered within this framework of waste legislation. Nevertheless many Japanese companies put in place, in effect, voluntary 'RoHS' agreements since the late 90s and Japan now has its own version of RoHS with implementation planned to coincide with 'European RoHS' in July 2006.

Table 2: Scope and status of Japanese legislative developments

Fundamental Law

▸ The 3Rs strategy is underpinned by the Fundamental Law for Establishing a Sound Material-Cycle Society that was put into force in January 2001 and establishes the basic principles under which other environmental legislation should operate. This imposes the obligations of different sectors and the measures to be taken by national government and comes under the responsibilities of the Ministry of Trade, Economy and Industry (METI).

▸ Under this Fundamental Law comes the basic laws that then govern the practical application of detailed regulation.

LPEUR

▸ The Law for Promotion of Effective Utilisation of Resources (LPEUR) deals with the 3Rs through product-related law.

▸ It was applied in April 2001 and provides for 3R 'producer responsibility' measures to be taken by business in the production stage. These include design, labelling for separate collection and the development of an end-of-life (EoL) take-back system. It applies responsibilities to each party in the supply and consumption trail e.g. for businesses, rationalising the use of raw materials with the aim of minimising materials use and waste; for consumers, cooperating in separate collection; for national and local government, taking financial measures, and promoting green procurement and technology development.

▸ Ten designated industry areas and 69 product items were identified to be addressed by LPEUR, covering around 50% of municipal and industrial wastes. This all-encompassing law therefore requires that even those products not directly covered by specific 'producer responsibility' are under pressure and scrutiny to be encouraged towards improved environmental performance. It has also led to the development of additional take-back schemes for household PCs and portable batteries.

HARL

▸ Below LPEUR comes the Home Appliances Recycling Law (HARL). HARL was passed in 2001 and gives the producers – manufacturers and importers – of four domestic appliance types the responsibility of providing a national take-back scheme and achieve recycling targets.

▸ Air conditioners, washing machines, televisions and fridges/freezers were targeted as the items where the greatest environmental net benefit could be achieved. Some new categories are under consideration but these are not yet defined.

▸ The regulations lay down specific recycling targets for the four types of appliance and only relate to household waste equipment. Business WEEE is not covered by HARL, although under LPEUR businesses have a duty to maximise recycling.

- There are no targets for collection, but items collected must be recycled through the system. The system commenced in April 2001, at which point manufacturers took responsibility for the collection and recycling of these items. A levy is placed on consumers for each unit disposed of.

- The scheme includes two consortia, A (including Panasonic, Matsushita and Toshiba) and B (including Mitsubishi, Fujitsu, Hitachi, Sanyo, Sharp and Sony). A has 25 recycling centres and B 15 centres (although these figures vary dependant on sources).

- It should be noted that, although LPEUR and HARL are stated to be based on 'producer responsibility' there is a major element of 'consumer responsibility' since consumers pay for the schemes. In this sense it differs from WEEE which is wholly paid for by producers.

GPL

- In May 2000 the Green Purchasing Law (GPL) was enacted to establish green purchasing as national policy. Under the law, all governmental bodies must conduct green purchasing.

- Each body must create and publicise its purchasing policy each year, implement green purchasing based on the policy and report purchasing records.

- There are over 150 items on the list which includes office equipment, lighting and electrical goods.

- The GPL complements and supports voluntary purchasing initiatives, in particular the Green Purchasing Network, established in 1996 to promote green purchasing and whose participation includes Matsushita Electric, Sony and NEC.

Japanese RoHS

- Hazardous substances in products have already been substantially phased out by major Japanese companies voluntarily in preparation for the European RoHS.

- The 'Japanese RoHS' Law was passed on 1st July 2006, its timing coinciding with enforcement of the European RoHS.

- The purpose of this law appears to be to ensure consistency in standards for products destined for home, EU and other markets and to pick up any laggards which have not conformed voluntarily.

- The 'Japanese RoHS' appears to focus on marking rather than being a materials restriction law.

In Japan there have been particular drivers for legislation in this area.

Waste and resources legislation is just part of a coordinated range of legislation formulated by government in close cooperation with industry. With annual waste arisings of 450 million tonnes from all sources, and existing commercial landfill space due to run out in 2008, the country has been seeking to reduce dependency on both natural resources and land disposal. Sustainable development is seen as an essential part of economic progress. Japanese industry which, with its cultural commitment to R&D, appears to view the challenge as an opportunity to improve manufacturing and design processes.

There also appears to be a national agenda of developing a competitive edge in recycling and other environmental technology.

Implementation of legislation appears to have been relatively smooth and successful in the Japanese 'compliance culture'. Key features of the implementation process for HARL have included, for example: joint development by industry and relevant Japanese ministries; clear responsibilities, a clear timetable and clear environmental objectives; focused application for optimum achievable benefit (e.g. on key household electronic products not all WEEE types);

provision to industry of a risk-free framework in which to invest.

Implementation has been supported by administrative arrangements and by major investment in infrastructure, in particular the establishment of 40–50 recycling centres across the country. Industry has been heavily involved in the process and leading EE companies have established a significant recycling plants. The current recycling levels resulting from HARL are around 50–60% for the main product categories.

Japan used voluntary agreements and a lead-free road map from late '90s to drive lead and other hazardous substance out of products ahead of legislation in Europe. As a result many Asian suppliers will have already been hit by Japanese requirements on hazardous substances through the supply chain, as well as more general requirements for improved recyclability and energy efficiency.

2.3 Europe–Japan comparison

From the review above, when considering the European and Japanese situations there are both similarities and differences in regulatory drivers, approaches, industry initiatives and implementation of environmental and social performance requirements relating to EE products and suppliers.

Table 3: Europe–Japan comparison

	Europe	Japan
Legislation		
General	Mainly EE specific	Part of a more general waste legislative framework
Main drivers/aims in EE product legislation	· 'Producer responsibility' · Pollution prevention/health and safety · Reduction of waste to landfill · Energy efficiency/greenhouse reduction · Harmonisation of national legislation	· Resource efficiency · Landfill shortage · Strategic · Producer and consumer responsibility
RoHS	Implemented 1st July 2006	Implemented 1st July 2006. A marking rather than restriction law although voluntary restrictions already in place
WEEE v HARL	· WEEE legislation enacted in most countries but variable approaches to implementation · Based on 'producer responsibility' and paid for by producers · Covers 10 broad product categories	· HARL involves 'consumer' as well as 'producer responsibility' and is paid for by consumers · WEEE under HARL covers four types only (fridges, air conditioner units, TVs and washing machines)
EuP, REACH and IPP	Under consideration	No specific equivalents
Green purchasing	Policies but no specific laws	Specific law since 2001
Levels of regulation	Variable. Advanced in some countries but newly implemented or under consideration. Regulation less advanced in less environmentally aware countries and newer MS.	Advanced (since 2001)
Implementation		
General	In the EU there are 25 countries with different cultures and levels of greenness. Consensus has been difficult to achieve. Industry has been heavily lobbying against legislation or for amendments.	Consensus has been fairly easy to establish. Industry has actively cooperated in regulatory development and implementation.
Recycling infrastructure and implementation	Established EE recycling infrastructure in some countries but generally limited.	Major investment in recycling infrastructure and organisation; high levels of recycling.
Industry structure and take back	Fewer major producers, direct 'take back' and market opportunities for EE recycling.	Advantageous: Significant number of major producers, with a captive collection markets, high levels of vertical integration, low barriers to re-use of collected material, clearly defined collection routes and logistics, transparent cost mechanism, development of new process technologies and guaranteed minimum volumes for recyclers.

Involvement of major EE companies in recycling	Some involvement in some countries	Major involvement
Involvement of major EE companies in supply chain environmental management	Major European-based as well as Japanese companies engaged in environmental procurement and supply chain partnership, and in pushing quality, safety and environmental management and standards along supply chains.	Japanese companies engaged in environmental procurement and supply chain partnership, and in pushing quality, safety and environmental management and standards along supply chains.
Social responsibility	European and US-based companies appear to have been more involved in the social and ethical side of CSR and in assessing suppliers' performance in these areas.	Japanese-based companies do no appear to have been very active in these areas so far.

2.4 Other regulatory and standards developments affecting EE suppliers

In addition to regulatory developments in Europe and Japan there have been a number of other broader regulatory and standards developments with implications for the environmental and social performance of EE suppliers.

These fall into the following main categories which are specific to EE:

- The development of The Electronics Industry Code of Conduct (EICC).

- The establishment of supply chain standards with the Global Environmental Sustainability Initiative (GeSI).

- Developments in eco-labelling and energy labelling schemes.

- Development of other national RoHS legislation e.g. in China and South Korea.

- Increasing national legislation in Asian countries.

- IEC Standards for eco-design.

To these can be added other relevant developments such as the increasing adoption of international standards e.g. ISO 14001, ISO 9001, OHS 18001, SA8000 and ISO14062. While not EE or product-specific the first three provide now widely recognised generic frameworks for assurance of environmental, quality and OHS management by suppliers. SA8000 is increasingly accepted as assurance of ethical working conditions. ISOTR 14062 is technical guidance covering the integration of environmental considerations into product development and design.

International standards, although voluntary, are increasingly becoming de facto compliance requirements for operating in certain markets by providing assurance, especially to business-to-business (B2B) customers that management systems are in place.

A key factor driving environmental and social concerns and initiatives in the EE sector has been a major restructuring of the sector with an increasing shift of manufacturing, particularly to South-Asia East. As noted above, electronics and information communication technology (ICT) now represents a major part of exports from South and South-East Asia. This shift has affected all major TNCs whether European, Japanese, US or other and is increasing scrutiny and demands for higher and harmonised standards.

In a globalised market there are likely to be increased demands for common, standardised approaches in order to facilitate trade.

Table 4: International regulation and standards developments

The Electronics Industry Code of Conduct

▶ The first wave of 'corporate social responsibility' (CSR) developments in the EE sector focused on environmental aspects.

▶ In October 2004 various US companies launched the Electronics Industry Code of Conduct (EICC) which includes coverage of environmental, social and ethical issues.

▶ Hewlett-Packard (HP) facilitated collaboration on the code between itself, Dell, IBM and electronics manufacturing companies Celestica, Flextronics, Jabil, Sanmina SCI, and Solectron.

▶ The code was developed to establish and promote unified industry expectations for socially responsible practices across the electronics industry's global supply chain.

▶ The code potentially provides a route for a harmonised approach for monitoring suppliers' performance across several areas of CSR, including labour and employment practices, health and safety, ethics, and environmental protection.

▶ In November 2004 Cisco Systems Inc., HP, Microsoft and Intel Corporation announced a new working group, facilitated by Business for Social Responsibility (BSR), that will develop common mechanisms and tools to enable compliance with the Code.

▶ The members will work collaboratively with suppliers and partners in the supply chain to develop common approaches to supplier surveys, reporting methods, auditing tools, risk assessments and programmes. The joint effort reflects the participating companies' commitment to leadership in the area of CSR and their desire to help suppliers streamline their reporting requirements and make performance easier to verify.

Global e-Sustainability Initiative (GeSI)

The Global e-Sustainability Initiative (GeSI) is a joint initiative of an international group of Information and Communications Technology (ICT) service providers and suppliers, with the support of the United Nations Environment Programme (UNEP) and International Telecommunication Union (ITU). GeSI seeks to contribute to sustainable development in the ICT industry by taking a leadership role in collaborative exploration and responsible management in relation to industrial, ecological, and social systems.

In 2005/6 the EICC Board and GeSI agreed to partner in the development and deployment of a consistent set of tools and processes to measure and monitor supply chain Corporate Responsibility (CR) performance across the ICT sector.

Developments in eco-labelling and energy labelling

▶ Some general eco-labelling schemes have been successfully established in certain European countries such as Sweden, and apply to some EE goods. In general, however, product eco-labelling has not been a significant issue for EE producers, products and consumer markets.

▶ In contrast, energy labelling is well established across various appliance categories e.g. US Energy Star. Such labelling, however, normally only applies to the use phase of a product's life cycle.

▶ At the European level current initiatives include proposals on energy labelling of household appliances and the EU Energy Star Agreement.

▶ There is presently no scheme for providing customer information on embodied energy although leading B2B customers practicing eco-design will increasingly require such information from main suppliers.

Developments in other RoHS legislation

▶ Stimulated by 'European RoHS', various countries have sought to develop their own versions, including China and South Korea. The precise motivation is not clear. While concern about pollution and health and safety is one factor, another may be more strategic, namely to ensure the competitiveness of domestic industries in responding to European and Japanese RoHS. It is not practical or efficient for one part of a company or industry to go 'lead-free' while another part is using, for example, lead solder.

▶ These other versions of RoHS appear to go beyond the European RoHS and are still under development. This may be a precautionary approach in case the scope or requirements of the 'European RoHS' should become more demanding in future.

▶ The 'China RoHS' is being developed alongside a 'Chinese WEEE' law that contains 25 articles covering prevention of pollution, 'cradle to grave' management, non-toxic packaging, implementation (stated originally to

come into force on 1 January 2006 but now mid 2007), product labelling, producer obligations and penalties.

▶ The 'California RoHS' law is due to be implemented on 1 January, 2007. It will place a fee on computer monitors and TVs containing cathode ray tubes (CRTs) in order to fund recycling. It contains RoHS equalising measures which would prevent the sale of any electronics products in the State which would be prohibited in the EU because of the presence of heavy metals. It is intended to harmonise production and markets so that producers do not manufacture separate products for each market. It is unlikely to have any impact on the key players who will already have re-designed products for EU compliance.

▶ Other States are likely to follow for inter-State and international harmonisation.

Increasing national legislation in Asian countries

▶ There is increasing domestic environmental legislation, with which EE suppliers must comply, especially in China. This is arising from pollution issues in manufacturing as well as problems with e-waste.

▶ In China '3C' compulsory environmental certification is being introduced for certain EE products to ensure exports are not adversely affected by trade barriers.

Development of IEC Standards

▶ The International Electrotechnical Commission (IEC), in cooperation with the EC (CEN) has been developing a programme of standardisation to assist with the implementation of the EuP Directive.

▶ Various standards have been proposed or planned (CENELEC, December 2005), including: IEC 114 (eco-design guide for product designers), EC 109 (guide for product standards), IEC TC 111 (materials composition – proposed), IEC 113 (materials declaration), IEC TR 62321 (measurement and testing), IEC TR 62139 (environmental aspects in product standards), IEC TR 62018 and 62087 (power consumption).

Developments in ISO and other international standards

▶ Various ISO standards relate to the environmental performance of products, including ISO TR 14062 for product eco-design and ISO 14040 for life cycle assessment. These are guidelines only and not standards for certification.

▶ The main standards for company certification are ISO 9001 and ISO 14001, and are now well established and widely adopted in the EE industry, at least among larger firms. Although generally production rather than product-oriented they have had a major influence in pushing quality and environmental management along supply chains. The same can be said for safety standards which are growing in prominence (e.g. OHS 18001).

▶ ISO 9001 certification has been especially growing in China, which is the leading country for uptake worldwide with around 50,000 companies certified across all industry sectors. There has also been extensive adoption in other Far Eastern countries. Analyses of uptake by country and sector are available commercially and may indicate information on company types. A rough estimate from available aggregate data would suggest that around 10% or 5000 of the Chinese certified companies are in the EE sector.

▶ Socially-related standards are less well developed but adoption of SA8000 has been growing across many industries with around 800 enterprises certified worldwide. Certification of Asian electronics companies is still limited, however. By June 30 2006, certified companies in the sector included eight in China, one in India, one in the Phillipines and one in Thailand (source **www.sa-intl.org**).

▶ ISO is also developing a draft standard ISO 26000 on Social Responsibility in spite of opposition from some ISO members (notably the US which also opposed an ISO standard for OHS). This is due to be published in 2008 and will be a voluntary not a certification standard aimed at enhancing the credibility of claims made in corporate reports or elsewhere regarding the social responsibility of companies.

2.5 Green and CSR initiatives by individual companies

Driven by compliance requirements, stakeholder expectations, risk management and other factors, environmental supply chain management has become a major issue and activity in an industry where outsourcing is commonplace.

In an increasingly globalised industry, growing attention has been given to social as well as environmental life-cycle impacts. While the EE industry has often portrayed itself as 'clean', its environmental performance has come under increased scrutiny, in its core operations, supply chains and at the end disposal of waste. Poor health, safety and environment (HSE) standards in EE waste recycling in countries such as China have been

exposed by such non-government organisations (NGOs) as the Silicon Valley Toxics Coalition. Concerns about working conditions and use of child labour in outsourced manufacturing have led to the development of the Electronics Industry Code of Conduct (EICC) and to initiatives by particular companies with respect to managing their suppliers and supply chains and disposal or recycling of products. Demands on suppliers are increasing as a result.

As part of the AEDE project a survey was conducted amongst a sample of transnational EE companies on their supply chain product environmental practices, especially on sourcing from Asian countries. Table 5 summarises the results (which are detailed in the separate report – see Reports on **www.cfsd.org.uk/aede**).

Table 5: Green and CSR supply chain initiatives by companies

Environmental supply chain management

General

▸ Major EE companies have generally been among the leaders in environmental management, for example in ISO 14001 certification, green procurement and in reporting on performance. Most major firms have their own networks of suppliers for whom environmental performance will be one sourcing consideration along with cost, delivery and quality.

▸ All of the companies surveyed practice supply chain product environmental management to some degree, including communicating environmental requirements to suppliers through specifications, guidelines, briefings, auditing.

▸ The leaders operate environmental partnership programmes. These apply to both local suppliers in Europe or Japan, and suppliers in host countries for subsidiary operations. For example, Philips and Siemens from Europe and Sony from Japan have well established supplier partnership arrangements, including provision of information, training and other support as well as conducting auditing of suppliers.

▸ The major involvement of Japanese EE companies in national recycling and take back has already been noted. Some companies have been especially active in Europe. For example an alliance has been formed between Sony, Electrolux, Braun, and Hewlett-Packard to implement their own pan-European collection scheme.

▸ Across the industry as a whole, product-related environmental requirements focus mainly on materials compliance. A few leading companies such as Philips, however, actively encourage suppliers to apply eco-design.

Current focus on RoHS compliance

▸ The product and supplier environmental focus of EE OEM companies are currently heavily focused on compliance with 'European RoHS' requirements and on associated issues such as testing and inventory management. Wider environmental or eco-design requirements appear to have, at least for now, generally assumed a lower priority except in those companies adopting a leadership position.

▸ TNCs are anxious to ensure compliance – remembering the Dutch experience of Sony in 2003, no-one wants to be the first to be prosecuted under 'European RoHS' by a zealous inspector. The stakes, including inventory risks, are high.

▸ The main method for ensuring compliance is self declaration down the supply chain, combined with testing according to risk.

▸ Major companies are going beyond requirements for self declaration to requirements for RoHS management systems.

EuP and REACH the next issues

▸ The Directive on the Eco-Design of Energy-Using Products (EuP) is expected to elevate the importance of eco-design in supply chains, and companies are monitoring developments or involved in consultations. However they are waiting to see what will happen before committing to action.

▸ The REACH Proposal is expected to have more significant implications because of the potential costs of compliance.

Asian suppliers prominent in supply chains but a focus on first tier suppliers

▸ Transnational EE companies have complex, international supply chains of materials, components and assemblies. Asian countries, especially China, are a major part of the supply chains of most EE companies and SMEs will be part of such supply chains.

▸ However, the focus of supply chain management by TNCs appears on first tier suppliers which, in a high volume industry, tend be to relatively large companies rather than SMEs. A few such as Philips also work with second tier suppliers and beyond depending on risk and influence on improvement.

▸ TNCs do not generally appear to deal with, audit or directly influence or support SME and other suppliers in second tiers and lower tiers, although they may expect their first tier suppliers to do so, and will expect compliance and other information from the whole supply chain. TNCs provide specifications and other guidance, including materials declaration and testing and other requirements which may be passed onto or accessed by lower tier suppliers.

▸ Companies tend to adopt a risk-based approach to issues management. Products, materials and suppliers presenting compliance or other environmental issues are accordingly managed according to the business risk they present

(e.g. risks to reputation). As the risks have become high for RoHS compliance (especially the financial risks of product withdrawal) the requirements for suppliers in this area are becoming more stringent.

▸ Anecdotal evidence from TNCs suggests often low levels of awareness of compliance issues amongst SMEs. This is the case even in Europe where there has been extensive information and consultation.

The situation may be worse among Asian SMEs who have received little or sometimes incorrect information.

Sustainability and CSR management

▸ More recently some leading EE companies have embraced sustainability and CSR, and have established expectations and requirements on social performance by suppliers, including such issues as working conditions and use of child labour.

▸ Auditing of suppliers on environmental and social as well as quality matters has become the norm among leading purchasers.

▸ Some companies such as HP are initiating CSR and related programmes, including training and auditing relating to working conditions in supplier factories. It is not clear how far down the supply chain such initiatives will go.

3.0 Implications for suppliers

This section sets out the general implications for Asian EE suppliers, focusing on SMEs, which, as noted in Section 1.0, are likely to be the most vulnerable to changes in regulation.

3.1 General implications for suppliers

The following can be concluded from the project work to date.

1 Compliance with higher standards is a competitive necessity for suppliers to global markets

▸ Regardless of organisation, all EE producers and component suppliers are already required or will be required to comply with continually increasing expectations and standards of environmental and social performance.

▸ Compliance with basic and growing environmental and social standards is increasingly a condition of market entry and efficient compliance a competitive necessity alongside price, quality and delivery.

▸ While suppliers exporting to Europe and Japan will be most affected in the short term, there is a general global trend towards higher product standards.

▸ There is also a continual trend towards standardisation in order to facilitate and not impede global trade.

2 RoHS is the most pressing compliance issue but others are significant

▸ The most pressing issue for all suppliers in the short term is compliance with European, Japanese and other RoHS requirements.

▸ WEEE is a major issue for those suppliers also operating as 'producers' in Europe (i.e. with offices and distribution or production facilities) but all suppliers must be at least able to supply required information to OEMs operating in Europe and Japan. They may also be required to re-design products to for improved recyclability.

▸ The other developments such as EuP mainly pose medium to longer term requirements, especially to suppliers of energy-consuming products. Again they will need to supply information and may be required to apply eco-design. Design for energy efficiency will become increasingly important. IPP may also drive green procurement as well as requirements for eco-design.

▸ Compliance with legal requirements, especially RoHS and WEEE is mandatory for companies supplying to relevant markets. Non-compliance may lead to potential fines or other penalties for producers and the financial risk of having non compliant products removed from the market. Suppliers which create compliance problems for TNC or other customers are likely to be rejected.

All of these developments require suppliers to be aware of and understand applicable laws and the implications for their business e.g. in the EU whether they are classified as a 'producer'.

Compliance with other developments is mainly voluntary, such as compliance with company and international standards and the EICC. However such standards and codes often operate as de facto regulatory requirements when they become the competitive norm for operating in a particular market.

In summary the hierarchy of issues with respect to time horizons is probably for Asian suppliers as a whole:

▸ Immediate: RoHS

▸ Short to medium term (next 1–2 years): WEEE

▸ Medium-longer term (4–6 years): EuP

▸ Longer-term: CSR

For individual firms the hierarchy may vary according to their products, customers and markets. The timetable for action may be brought forward for sales to some customers and countries.

3 Compliance may require significant investment for suppliers

▸ Depending on markets, products and processes, compliance may mean significant expenditure in the short-term by companies in the following areas, especially for RoHS compliance:
· product-redesign
· re-tooling of production lines
· new materials
· new processes
· product testing facilities (in-house or by third parties)
· personnel training
· management time and expenditure on consultants or advisers
· potential write-off of redundant products and materials
· investment in integrated management systems.

▸ Precise figures are not available of what it will cost for industry as a whole or for individual companies across all phased-out materials under RoHS. A common estimate is 5–10% on production costs.

▸ Investment is likely to be an ongoing not one-off requirement as the performance bar is continually raised.

▸ More generally, competing in global markets or supplying to TNCs requires investment in management systems, including being certified to or at least operating to the general requirements and principles of ISO 9001 (and to ISO 14001 in some cases). Management systems standards specifically require monitoring regulatory and other developments relevant to the business, and, in the case of ISO 9001, ability to meet customer requirements; they require planning and resourcing for achieving compliance and improvement.

▶ Operating in line with such standards is basic sound management as well as providing required assurance to B2B customers.

▶ Companies not following such sound practices are not likely to succeed in international markets regardless of environmental compliance, and may damage the reputation of the industry in that country. For example quality problems with some domestically produced Chinese electronics components have been reported anecdotally. This may be a factor in most electronics exports consisting of imported components.

4 Suppliers which fail to meet compliance requirements or deadlines will be marginalised

▶ Because of their far-reaching implications, especially on industry costs and competitiveness, regulatory developments are relatively slow and involve extensive consultation with industry and other interested parties.

▶ Suppliers must nevertheless monitor the agenda and gear themselves up for compliance and be able to move fairly quickly once decisions are made.

▶ Suppliers which fail to comply are likely to be forced out of major global markets or lose TNC or intermediary customers operating in such markets. They may as a result be forced out of business or restricted to domestic markets or lower value export markets.

▶ Retailer pressure, especially by the major chains, could be a significant and growing influence. For example Wal-Mart has stated that it is going *green* and Ikea is focusing on the social as well as environmental dimensions of the supply chain.

5 SMEs are most at risk

▶ TNCs and larger firms are already close to the agenda and regulatory processes, and have invested heavily in compliance. They will have communicated requirements to first tier suppliers and in many cases provided assistance. Larger firms are generally more environmentally aware.

▶ Japanese companies appear to be especially aware of regulatory and other requirements and to communicate these to suppliers. They also appear to exert high levels of control and influence along their supply chains. Japanese EE companies have also developed a reputation for greenness and requiring good environmental performance from their suppliers.

▶ SMEs which are not under the control or influence of TNCs or national OEMs are potentially at most at risk of being unprepared for compliance, especially with RoHS. AEDE country reports have suggested generally low levels of awareness of European legislative developments until

relatively recently, although out of necessity there is now growing awareness of RoHS and investment in RoHS compliance.

The task of awareness raising and preparation for compliance appears to have been mainly left to industry, especially to individual companies, in most Asian countries.

Government support appears to have been generally limited. An exception has been Thailand where a more strategic national approach has been taken with information and support for suppliers (see Section 3.3).

From the survey of TNCs, support with compliance is likely to be limited beyond first tier suppliers.

3.2 General assessment of competitive, social and economic impacts

General

How much SMEs are likely to be marginalised for inability to comply with RoHS and other requirements is uncertain. It may be the case that they are already being marginalised on quality and other grounds if they are unable to meet demanding price, specification, quality, volume and delivery timetable requirements.

Factors influencing impacts include:

▶ The numbers significantly affected by RoHS and other legislation e.g.
  · the number supplying to export markets directly or indirectly
  · the number required to make significant investment in product change in order to compete
  · the numbers which may specifically lose contracts for failure to comply (i.e. excluding those not supplying to international markets anyway, or which have been supplying but are already being forced out for other reasons such as quality problems)
  · the number of dependents affected by any adverse impacts.

▶ The present state of preparedness and investment among SMEs.

▶ Opportunities for marginalised companies in the domestic market.

▶ The need to cut back or close.

▶ Opportunities for displaced employees in the local economy, especially in depressed regions.

▶ Pay and working conditions in alternative employment, including re-employment including larger EE companies.

Assessing these issues at the detailed level was outside of the scope of this project. Some general conclusions can be drawn from the country reports and other information available.

The AEDE country reports suggest that there may be significant numbers of SMEs and people engaged in manufacturing for international markets that need to phase out hazardous materials or otherwise re-design products. If so, then European and Japanese regulations and other requirements may, at least in the short term have negative impacts when considering the requirements and lack of preparedness.

In the medium to longer term the picture could be more positive:

▶ Having adapted to change, the EE industries will have enhanced capability in environmental management and eco-design, and be better placed to respond to compliance challenges and market opportunities.

▶ Raised awareness as well as mounting problems could help to stimulate and clean up of e-waste and stimulate cleaner recycling industries. The country reports highlighted serious problems in these areas, particularly in China and India.

For SMEs

The overall effect on SMEs may be negative in the short term for the above reasons and the following, but this depends on how the players respond and markets develop:

▶ If large companies and TNCs perceive that there may be a risk in their supply chain, they may switch to more reliable larger suppliers, creating a threat of lost business to SME suppliers:
   · for example, increasing requirements for 'lead-free' supply chains (or networks) may result in a number of smaller suppliers, unable to provide 'lead-free' solutions in time, being phased out of the supply chain.
   · inability to implement eco-design or supply environmental information may also be problematic in relation to WEEE and future EUP compliance.

▶ Those SMEs complying and retaining international business may have had to invest significantly, and this may reduce their competitiveness and possibly even their viability.

▶ Those not investing will lose any international sales to Europe or Japan but may be advantaged in domestic markets by being in a stronger financial position.

▶ Where suppliers failing to comply cannot switch sales to domestic or less particular international markets, there may be lay-offs and even liquidation if they are completely dependent on supplying to the EU market or a particular TNC or OEM.

▶ The costs of compliance are significant (RoHS is estimated as adding 5–10% to production costs) and may be prohibitive for many already operating on low profit margins.

As noted above, in the medium to longer term there may not be any significant impact and even positive impacts by strengthening industry capacity and management capability for environmental compliance.

Furthermore, in the SME sector everywhere there are high start-up and failure rates. In the fast-moving EE sector suppliers have to be responsive to rapid technological change, prepared to invest, and be competitive on price and quality. Firms which do not manage these things well will not survive anyway.

A structural industry effect might be to reduce the number of SMEs and increase the dominance of TNC subsidiaries, large OEMs and contract assemblers.

For employees, dependents and communities

The impacts on employees, dependents and communities in Asian countries will depend on the buoyancy of the EE market and economy and the capability of firms to switch sales to alternative markets, and the capability of any laid off workers to find employment quickly elsewhere; also on the relative wealth or poverty of those affected:

▶ Unemployment impacts will depend on alternatives. If, for example, displaced employees from a weakened SME sector were forced to work instead in larger EE firms whose position had been strengthened, the consequences for individuals would depend on the relative conditions and rewards.

▶ The consequences for the economy as a whole would depend on the nature of these larger firms. If there are domestic or other firms investing in innovation then this should benefit the economy. If they are manufacturing subsidiaries with little or no design and innovation, then a decline in SMEs could reduce the relative level of innovation in the economy and this may be harmful to the economy as a whole.

▶ The worst case situation is where employees are relatively poor, there are no immediate alternatives and lay-offs or closures result in impoverishment for employees and dependents.

▶ Where a community is dependent on a thriving SME sector, there may be negative knock-on effects in the event of lay-offs or closures. There could be significant unemployment impacts in locations where other work is unavailable.

▸ The gender effects are uncertain but if SMEs provide relatively more or better opportunities for women in employment, education and training, compared to subsidiaries or assemblers, the disadvantaging of SMEs would have a net negative effect. The effect may depend on the cultural dimension and structure of the SME workforce, including the proportion which is women working casually and the proportion which are migrant workers.

For industry and national economic development and competitiveness

The scale of any negative effects may or may not be significant when set against local, regional or national economic development:

▸ If there has been a lack of investment and preparedness across the industry as a whole, it is possible that some countries' industries and even national economies may be competitively disadvantaged relative to others that have taken a more strategic approach.

▸ Furthermore, a healthy SME sector favours local earnings and the local economy whereas foreign manufacturing subsidiaries may 'repatriate' profits to parent companies.

▸ Industry structure, especially relationships between SMEs and larger firms is an important consideration. Where SMEs are supplying to larger firms then the latter will have an important role in driving innovation and growth in the EE sector in a country or area. Where larger firms are mainly sourcing components internationally their role in the national, regional and local economy will be more limited.

▸ The value of foreign investment and TNCs should not be forgotten. By providing employment the growth of the sector will have improved standards of living for many, and contributed to general economic development in the countries in question. To the extent that industry earnings accrue to the countries' national economies there may also be significant wider benefits such as investment in industrial and technological development and in physical and social infrastructure, including education and training. There needs to a balance, nevertheless between the roles of larger companies and SMEs.

Government and trade associations

The potential for adverse effects on an important industry sector suggests a need for respective governments and trade associations to be proactively engaged in supporting their respective SME EE sectors with environmental compliance.

Wider issues

When developments in Europe and Japan are considered alongside developments in the US (where many States are considering separate RoHS legislation), it has been suggested in some quarters that globally, suppliers may be unable to meet demand for 'lead-free' products, and that this could create shortages and problems for OEM producers. Whether this turns out to be the case is unclear, but any supply problems may slow the global transition process and enable some buying of time for suppliers. A key factor may be how far China goes in enforcing its own proposed RoHS.

3.3 Assessments of country impacts

The AEDE country reports covering China, India and Thailand reinforced this project's concerns regarding the generally low awareness and preparedness of SMEs and potential impacts, but did not assess impacts at the detailed level which will be highly situational and depend on the factors set out in Section 3.1.

With respect to scale and economic and social impacts, the greatest impact is likely to be on China which has by far the largest EE industry and number of SME EE suppliers and numbers of dependents. The China country report expressed particular concern regarding industries such as microwave ovens and air conditioners already operating at very low margins.

It could be considered, however, that if most exports are assembled from imported components and assemblies, export market opportunities are already limited for smaller SMEs (since contract assemblers in high volume product markets are likely to be larger firms). The impact of RoHS and other laws on smaller SMEs is less clear, and may lie more in the way it is raising general industry standards and imposing higher cost burdens for firms which affect their ability to compete.

The India report expressed most concerns:

▸ Despite some highly competent EMS companies in India, the industry average performance level was reported as low when benchmarked with other emerging economies including Thailand, Taiwan and China.

▸ Indian industry and the national economy could be competitively disadvantaged relative to other countries if there is insufficient investment and government support. This could imply job losses, factory shut downs, operational losses of companies and depressed incomes impacting the entire economy.

▶ The option of switching sales to other international markets (with lower standards) appears to be quite limited as compliance norms are soon going to be in place internationally.

▶ The magnitude of unemployment following lay offs by non-compliant companies will depend on how fast the released employees can find work elsewhere and also the economic base of the location. In depressed economic regions, the negative impact of lay offs are likely to be significant impoverishment for employees and dependents. Prospects are better close to large manufacturing hubs such as Bangalore, Delhi, Mumbai and newly emerging centres such as Hyderabad, Pune and Chennai.

▶ The impact on women employees is also expected to be negative. The SME EE industry in India has a very high percentage of females in the work force. Since most female employees are from depressed backgrounds, there could be adverse economic and social implications.

The Thailand country report expressed general concerns regarding potential impacts, especially the disproportionate burdens on second and third tier suppliers (which are mostly SMEs) compared to first tier suppliers (which are mostly large assemblers). Nevertheless many firms in the first and second tiers appear to be well prepared (80% and 50% respectively).

This situation may reflect partly the effort that has already gone into preparation (Table 7), and also the structure of the industry, with relatively fewer independent SMEs and more engaged in assembly or subsidiaries of TNCs.

Table 7: Thailand eco-design and compliance support initiatives

Examples of initiatives include:

▶ Various life cycle assessment (LCA)/eco-design initiatives e.g. by the Thai Environmental Institute (TEI).

▶ The 'Green Camp' project by Thailand is Electrical and Electronics Institute (EEI) and others, includes expert training, 'train the trainer', industry training and pilot projects.

▶ Industrial awareness and capacity building (seminars, consulting, demonstration projects, methodology development).

▶ Forums and networks: Thai LCA Network, Thai RoHS Forum, Thai Green Design Network.

▶ International consultation e.g. IEC/TC111 WG2.

▶ Research centres, universities, government and industrial organisations have been involved in all initiatives.

All three country reports, nevertheless were positive regarding the medium to longer term, recognising the continuing growth prospects for the industry and market opportunities and industry quality improvements – and job prospects – resulting from raised standards.

4.0 Gaps and future needs

The AEDE country reports suggest that there are serious gaps in the capacity of many Asian SME suppliers to meet requirements stemming from European and Japanese regulatory and other product-related environmental requirements, and that there is general and urgent need for capacity-building support from governments and industry associations.

This report focuses on management and technical needs for support in the areas of information, RoHS compliance and eco-design. Other needs such as government policies (e.g. tax breaks), access to capital and marketing support are outside of the scope of this report.

Potential needs are considered in two main areas: management and technical. Responding effectively to regulatory change and other developments requires skills in both.

4.1 Management needs

Where not already in place, suppliers need to implement management systems of appropriate sophistication, basic for small firms and more sophisticated, if not certified to ISO 9001 (and ISO 14001), for medium-sized or larger firms.

General

Management elements which need to be in place include:

Information

- ◘ Companies need timely and relevant information to keep abreast of changes and be aware of implications through, e.g.
  · monitoring systems
  · compliance control
  · internal communication and information systems

- · external communication with customers, industry associations, national regulatory authorities and government agencies
- · subscription services
- · advisory services.

Planning

- ◘ Developing and implementing strategies for phasing out of hazardous substances, including investment in new production lines, equipment and materials, testing arrangements, training of personnel and other changes.

- ◘ Developing and implementing strategies for re-designing products and production processes as necessary to facilitate recycling, energy efficiency or other requirements and providing requisite information to OEM customers or labelled finished products in accordance with WEEE or other requirements.

- ◘ If required to comply with requirements under EICC or other customers' supplier requirements, developing plans for improving working conditions.

Organisation

- ◘ Developing management resources and skills to manage compliance and change, in particular planning, quality management (including auditing) and eco-design.

- ◘ Integration of eco-design and green procurement into organisational processes.

The country reports identified general and specific gaps in information provision and in environmental management. Complementary and additional recommendations on management needs were as follows:

Table 8: Further management needs proposed in country reports

China

- ◘ Raising awareness of environment/health issues and the impacts on Chinese enterprises (lack of awareness is believed to have lost export markets).

- ◘ Collecting, sorting and disseminating information: utilising the various government, industry and other channels for Chinese enterprises to obtain information on environmental requirements for electronic products in international markets.

- ◘ Encouraging ISO14001 certification.

- ◘ Implementing the China Compulsory Certification (3C) System for specified products.

- ◘ Improving eco-labelling system in the EE industry.

- ◘ Developing an internal environmental management function/department within enterprises and associated management systems.

India

- Understanding and tracking all relevant legislation and their implications.

- Provision of timely and relevant information to cope with ongoing changes and their implications.

- Collection and communication of life cycle information including EuP and other technical requirements e.g. energy management, labour standards, etc.

- Development of environmental management system best practice, including eco-design and skills development.

- Promoting ISO14001 and ISO 9001 certification.

- Working with all key stakeholders, e.g. government, industry, etc

- Developing an effective planning system, including strategies for phasing out hazardous substances, investment in new production lines, processes, materials, testing capabilities, training and other requirements, strategic planning for re-designing products and production processes, eco-labelling and other activities.

- Formulating plans for SA 8000 and improved labour standards and working conditions.

- Development of organisational skills to cope with the challenges of compliance and change, including planning for management and audit of quality and eco-design programmes and integration of eco-design and green procurement into organisational processes.

Thailand

- Further development of eco-design initiatives.

- Establishment of a Thai focal point for EE LCA data collection and dissemination, defining product testing standards and benchmarking.

- A centre of excellence in knowledge transfer was proposed.

- The Federation of the Thai Industries should be a focal point for cooperation between the government and private sectors in green supply chain, green procurement, and consumer awareness of green products.

4.2 Technical needs

Awareness and training

This is a basic need. SMEs generally have little awareness and understanding of environmental issues and CSR issues, and as yet few governments in these countries have started programmes covering eco-design, hazardous materials substitution and recycling.

The main areas of need are likely to be in:

- Legislation and implications

- Planning for and managing change

- Management of eco-design

- Use of appropriate eco-design tools

- Collection and communication of life cycle information (especially for EuP).

Technical implementation

Suppliers are likely to need practical advice in such areas as:

- Available technologies for hazardous materials substitution.

- Testing methods and options, including use of in-house, industry facilities or independent certifiers. Testing and

analysis of products and the technologies is a pressing need. Sony, for example, is reputed to have retrained a thousand quality auditors to undertake testing and analysis of products to comply with RoHS.

- Training in eco-design, including use of design tools.

- Information systems for compliance.

- Collection of good quality data.

For those companies that have manufacturing operations in Europe or are otherwise deemed 'producers' in Europe under WEEE, will also have to set up 'take-back' and recycling requirements of the nationally transposed WEEE Directive. There may be problems in that many companies from South/ South East Asia have sales/marketing offices in Europe – with no environmental management function – and many may not be aware that they are deemed to be a 'producer' under WEEE and will have to join compliance schemes or make their own arrangements for recycling.

Those required to comply with RoHS will need to establish testing facilities or arrangements with third parties.

The country reports support these general gaps and needs.

Complementary and additional proposals were as follows:

Table 9: Further technical needs proposed in country reports

China

- Promoting the application of eco-design, focusing in the immediate-term on on restriction of the toxic and hazardous substances. Reduction of energy consumption in EE products.

- Promoting interchangability of parts.

- Establishment of an e-waste 'take-back', reuse and recycling system at government and enterprise level.

India

- Identifying the main technical needs to run appropriate programmes and provide matching support systems.

- Creating technical infrastructure and support systems (for eco-design, recycling, e-waste collection, treatment, disposal, etc.).

- Technical training, know-how transfer and developing expertise on cleaner process technologies.

- Creating new technical institutes and identifying some existing ones to lead all technical environmental aspects.

- All stakeholders need to be assigned well-defined responsibilities and made accountable for their actions, e.g. industry, professionals, shop floor workers, researchers, NGOs, e-waste management agencies and governments.

- Training on operational aspects e.g. eco-design, tooling, processes, testing and validation.

- Developing plans for the future e.g. product re-design, re-tooling of production lines, new materials, new processes, product testing facilities (in-house or by third parties), personnel training.

Thailand

- Development of R&D capability and support for SME suppliers in resolving technology problems (Thai firms were considered less capable in this area than Malaysian companies).

- Development of technology standards in testing and certifying products, organisation for authorisation, certification, and inspection accepted at international level.

- Establishing a focal point for assistance in disseminating technological knowledge to producers, including clear and reliable information for industry, knowledge and information for SMEs.

- Urgent issue of upgrading product technical standards.

5.0 Capacity building plans

The AEDE project work suggests a likely need for the EC, possibly in cooperation with Japan and US, and through appropriate national agencies, to provide some level of support to SMEs in Asian countries affected by RoHS, WEEE and other future initiatives e.g. EuP and REACH.

There are various reasons for providing such support according to need (e.g the degree of disadvantage and any impoverishment caused by such initiatives):

◼ Ethical: since suppliers have been required to invest to provide environmental benefits for Europe; also since the suppliers most affected are likely those least able to afford it.

◼ Fair trade: to ensure that regulations are not a barrier to trade.

◼ 'Producer responsibility': many of the suppliers' TNC customers are based in Japan or Europe.

◼ Economic: when set against the benefits, the type of capacity-building support envisaged is mainly information and training which is relatively inexpensive.

Plans need to be formulated at the detailed level through the project, government, trade association and industry stakeholders, taking account of specific country and sub-sector needs.

The following suggests an indicative structure for such plans in the short, medium and long term.

5.1 Short term plans

The immediate need is to develop an overall short and long-term plan for the Asian region as a whole and individual countries according to the AEDE country needs analyses.

This overall plan could include:

◼ Development and implementation of information and communications processes, including possibly an intranet site.

◼ Briefings for senior management.

◼ Development and delivery of training in compliance requirements and management.

◼ Development and delivery of specialist training in eco-design, supply chain management and, as relevant, CSR issues.

◼ Development and implementation of specialist technical training e.g on testing.

◼ For those classed as 'producers', provision of training on establishing a recycling schemes (e.g. researching recyclers, developing evaluation criteria, payment processes).

◼ Developing booklets, CD-Roms or downloadable information in national languages.

◼ Training could be formal or through workshops. Use of the internet, e.g. through webinars, if there is good ICT infrastructure.

In developing training plans the following needs to be considered:

◼ Training needs analysis

◼ Provision of basic awareness

◼ Training on specific and tailored eco-design concepts e.g. 'design for e-waste reduction'

◼ Training of trainers is desirable

◼ Training in national language

◼ Many SMEs in developed and developing countries are disconnected from trade associations – therefore SMEs will also need to be targeted directly.

Plans will also need to take account of preferred national approaches, for example government or industry initiatives and provision of support to date or planned.

Government regulation and voluntary industry initiatives are equally important in promoting eco-design. A combination of standards set by governments, economic incentives provided by governments and voluntary industry wide initiatives are needed to make eco-design a priority amongst producers and suppliers.

In the short term the focus of effort will need to be on RoHS compliance and concentrate on basic information and communication, and training across all areas, building on any existing initiatives and reaching as many SMEs as possible.

One approach could be to target key suppliers who would cascade the information to their own suppliers.

5.2 Medium term plans

The medium to longer term plan would be to provide ongoing support to help SMEs to respond to future regulatory change and other initiatives in an effective way.

The broad areas of need would remain the same but are likely to be at a more sophisticated level as skills and knowledge are developed.

In the medium and longer term there would be a need to institutionalise training and education programmes within the trade associations, professional training bodies and universities in China, India and Thailand.

Other areas of training could relate to gaining competitive advantage through eco-innovation.

5.3 Long term plans

Planning for the longer term is likely to include building on
and extending short and medium term initiatives as well as
positioning to respond to continuing developments in Europe,
Japan and the US. These need to be kept under review but are
likely to include:

▸ Increasing requirements to apply eco-design and provide
  LCA information along the supply chain.

▸ Increasing requirements to conform to CSR requirements
  along the supply chain.

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The Centre for Sustainable Design

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